The MAC Flyer

JANUARY 1982

Hidden Hazards . . . page 18

The MAC Flyer

MILITARY AIRLIFT COMMAND

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For Greater Safety and Efficiency in MAC Air Operations.

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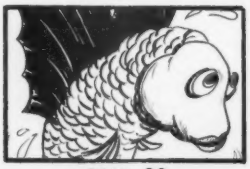

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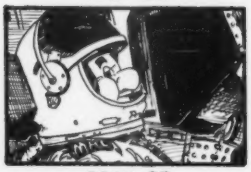

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–Front cover photo courtesy of 1Lt Al Tyler, HQ MAC/PA

INCORRECT VOLUME NUMBER, SHOULD READ
VOLUME 29.

Join the In-Crowd

You too can step up to distinction. Just look at this group of "distinguished" flyers, all decked out in their "Terrorific" T-shirts. Just look at those cool, self-assured expressions. A glance tells you that they are in control of the situation—confident, fearless (and a couple, hairless). That's because they've entered the 1982 MAC Flying Safety Writing Contest. They've contributed above and beyond the call. They've fought the good fight. They've climbed the mountain and peeked over the other side. They've met the safety enemy and realized that "it is us." And so, they climbed down the mountain (a very rugged trip judging by the look of them) and pounded out their respective literary masterpieces using the following rules as a guide.

The Rules

The 1982 MAC Flying Safety Writing Contest is conducted according to MACR 900-3 and the following rules. All entries must be original, unpublished, and postmarked no later than 31 March 1982. Stories must be between 1,000 and 3,000 words long (about 6 to 14 double-spaced typed pages); poetry should be about 75 to 100 lines. Entries must contain an aviation safety message. Manuscripts must be double-space typed and submitted in two copies. Identify entries by title only, and attach a cover sheet showing the author's name, address, phone number and unit. Also, the cover sheet should contain a brief autobiography.

The contest is open to anyone. Entries qualifying under the above rules earn their author a free C.R. Terror T-shirt (so indicate your size) and a one-year subscription to *The MAC Flyer*. However, contest prizes (desk sets and plaques) may only be awarded to military and civilian employees of the Department of the Air Force or Air Reserve Forces. Other entrants may be selected for Honorable Mention in a Special Category. All winning stories will be published in *The MAC Flyer*. Entries should be addressed to:

Safety Writing Contest
HQ MAC/IGFE
SCOTT AFB IL 62225

Advanced Civil Military Aircraft

ACMA: Airlift for the Future

by Lt Col Ronald L. Baldwin and Major James E. Mrazek, HQ MAC/XPS

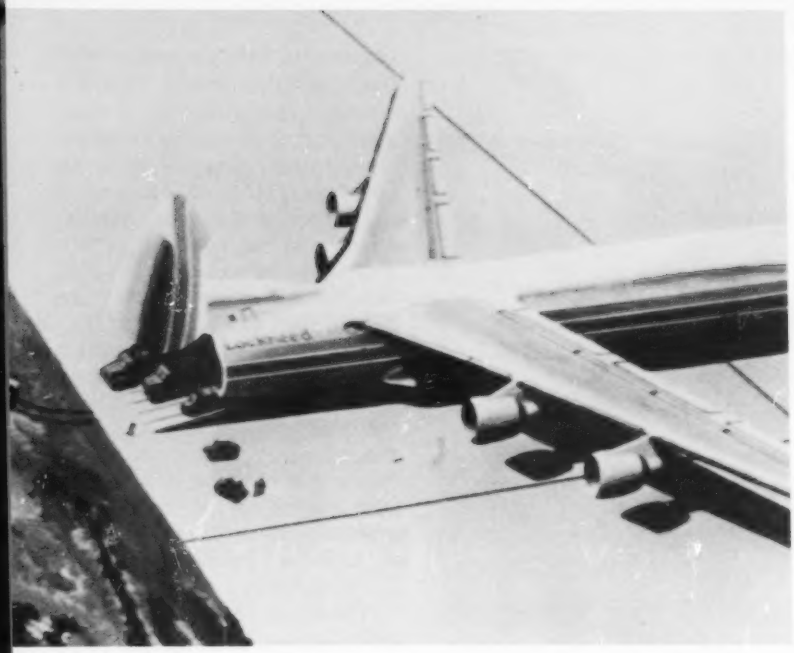
The announcement of McDonnell-Douglas as contractor in the C-17 (C-X) program promises solutions to very pressing problems for MAC airlifters in the future. C-17's would join our C-130's, stretched C-141's, and the improved C-5's to give us a wide range of airlift capability. Looks like the MAC planners can finally relax and take an afternoon off, right? Wrong! MAC is already looking at possible airlift requirements 20 years down the road, and airlift aircraft of the 21st century are beginning to take shape.

But why worry about it now? Because we know the service lives of the C-130, C-141 and C-5 are not indefinite, and even with the C-17 on the horizon, we will eventually have to replace some of our aging airlift aircraft.

It is also apparent that the acquisition process of a major weapons system in these times is very long. We must begin now to plan for these airlifters as well as to develop the advanced technologies that will be a part of them.

For several years, MAC has worked on the concept of an aircraft to meet not only the future needs of the military but those of our nation's civil sector. We propose using advanced technology incorporated into a joint development program that will enable our nation to maintain its leadership in the air transportation sector worldwide and assure a strategic capability during contingencies. This jointly developed aircraft of the future has been named the Advanced Civil-Military Aircraft (ACMA).

The concept of a single basic aircraft design which could meet both military and civil needs is not new. Much of Soviet military airlift capability exists in the form of its national airline, Aeroflot. In the United States, however, the airline industry has traditionally purchased aircraft designed to meet civil needs, while the military community has generally contracted for aircraft designed for military use. There have been exceptions



to this rule as evidenced by aircraft bought "off the shelf" such as the C-9 (DC-9). Still, the majority of military aircraft have been "custom built." And so far, each side has been able to absorb the developmental costs involved. In the future, however, the rising costs of producing technologically advanced aircraft may become too costly for the civil sector to manage alone.

Recent studies by Douglas Aircraft Company indicate that by 1995 the total requirement for airline passenger capacity will be more than 2.3 *times* the available capacity in the world today. In order to meet its share of this future market, the U.S. airline industry will have to invest more than $84 billion in constant 1981 dollars.

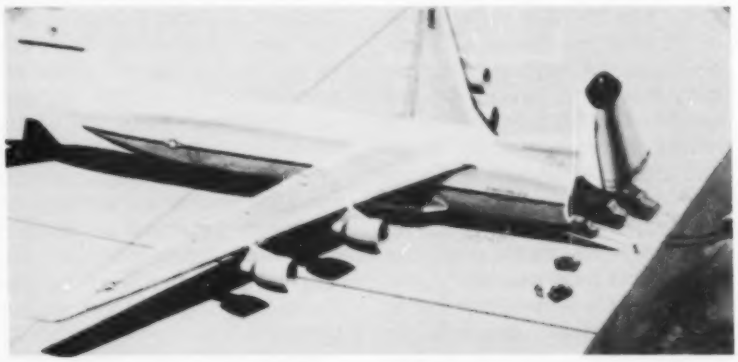
A similar civil industry dilemma is developing in the cargo area. Commercial air cargo traffic is forecast to increase 7.7 percent annually in the next 15 years. By 1995 the worldwide cargo capacity requirement will be over three times the cargo miles flown in 1980.

The combined passenger/cargo "capacity gap" in the years to come will create a worldwide market for approximately 4,650 new passenger jets and 360 new freighter aircraft by 1995. Can the U.S. air carriers come up with enough capital to fund their share of the market?

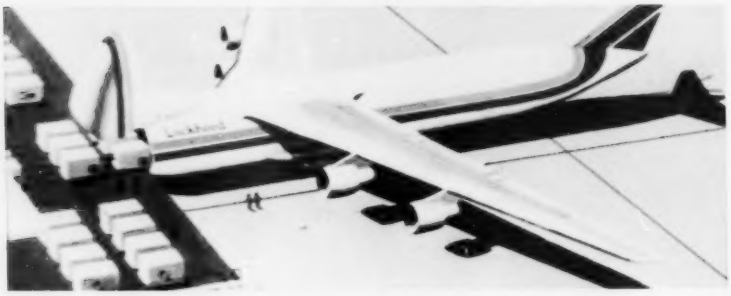
MAC is offering an alternative through its proposal for a jointly developed ACMA.

The result would be an aircraft that could perform in both the civil and military sectors in either the cargo or passenger role. The key to the success of this program is commonality, which leads to affordability. If the airplanes produced for each user have a great deal in common, they will cost less, not only to buy, but to maintain.

The ACMA design will have to employ new technology to do more work at a lower cost. Planners estimate that aircraft performance can be improved 20 to 40 percent by adopting advanced technology that we know about today—active controls, composite materials, more efficient engines. Taking a realistic viewpoint, the airframes must differ somewhat but the ACMA concept will allow both the civil and military users to get their requirements built into the aircraft before it leaves the assembly line. For example, only the military versions would have an airdrop capability. But



Photos courtesy of HQ MAC/XP, Boeing and Lockheed-Georgia.



LGA-144C vs C-5A

	C-5A	LGA-144C
Design Payload (Lbs)	220,000	390,000
Design Range (NM)	3,250	4,000
Gross Weight (Lbs)	769,000	1,038,000
Wing Span (Ft)	223	298
Length (Ft)	248	286

both versions would have common fuselage features, and thousands of parts would be interchangeable, thus reducing cost. The military style ACMA might have roll-on/roll-off capability and a strengthened floor to carry loads like today's C-5 can handle. On the other hand, the airline model would do things that today's wide-body airplanes can't do—like moving very large, heavy military equipment. We can't say for sure what the ACMA will look like, but it will probably be somewhat similar to current aircraft designs. In general, you might expect to see an aircraft in the 150 to 200-ton payload category, but 600-ton payload carriers are also under consideration. Up front in the airplane you can expect to find the latest in avionics. Economy is the driving factor, however, and innovative cockpit features will probably have to justify themselves through increased productivity and safety. Cargo handling equipment will include improved versions of today's best, and again the type will largely be determined by the common needs of the aircraft buyers.

Along with some aircraft manufacturers, MAC planners think the ACMA should be a "family of aircraft" covering the entire spectrum of air transport needs. The largest version would be equipped for transoceanic passenger and cargo hauling and would replace our current strategic airlifters. Another modification might produce an aircraft with 120,000 to 150,000-pound payload for the domestic market. A smaller short-range version could handle commercial feeder routes with additional application for tactical airlift. Using the family concept, the total market for airlift, military and civilian, could be satisfied at reduced development and operating costs.

Promoting commonality of airlift equipment to satisfy the needs of both government and private enterprise is pretty much a new idea in this country. In fact, the concept of representatives from the major airlines, aerospace industry and an alphabetical amalgam of federal agencies from DOD to OMB sitting down to agree on a new airplane program may be hard to imagine. The final decision could involve the President of the United States to give it national direction and purpose in the form of an Executive Order. With his support and that of the Congress, the enhanced partnership between the civil and military sectors can become a reality. Used to full advantage, the ACMA will maintain the United States' world leadership in transport aircraft production and insure a safe and productive "family of airlifters" for the 21st century.

MAC INDIVIDUAL FLYING-HOUR MILESTONE AWARDS

MSgt John P. Beckman, 313 MAS

Lt Col Tamotsu Shingaki, 53 MAS
CMSgt James A. Copeland, 53 MAS
CMSgt Kazud N. Shimono, 53 MAS
SMSgt Billy F. Furr, 145 TAG

Lt Col Walter R. Bono, 143 TAS
Lt Col Jose G. Calderon, 53 MAS
Lt Col Charles L. Finch, Det 4, 1401 MAS
Lt Col Emil E. Friedauer, 41 TAS
Lt Col Alvin L. Gray Jr, 53 MAS
Lt Col Robert W. McCreary, 41 TAS
Lt Col Robert W. Meals, 53 MAS
Lt Col Bobbie L. Mitchell, 41 TAS
Lt Col Vance D. Mitchell, 53 MAS
Lt Col Robert W. Wright, 53 MAS
Maj Thomas E. Baars, Det 4, 1401 MAS
Maj Glenn M. Curtis, 301 MAS
Maj Ralph H. Oates, 709 MAS
Maj Robert W. Whitehouse, 301 MAS
Flt Lt David W. Gale, 41 MAS
(RAF Exchange Pilot)
SMSgt John R. Strickland, 53 MAS
SMSgt Marvin H. Wagner Jr, 912 TAG
MSgt Richard J. Bender, 53 MAS
MSgt Michael A. S. Cox, 53 MAS
MSgt Alfred R. Gagnon, 709 MAS
MSgt Richard L. Gordon, 345 TAS
MSgt Robert P. Hansen Jr, 53 MAS
MSgt Robert C. Johnson, 305 ARRS
MSgt Russell D. Leadbetter, 164 TAS
MSgt Raymond J. Lyon, 305 ARRS
MSgt Albert Overstreet, 41 TAS
MSgt Lohr D. Pickering, 345 TAS
MSgt Clarence R. Powell, 41 TAS
MSgt Raymond P. Sylvestre, 53 MAS
MSgt Robert W. Weiseman, 913 TAG
MSgt Brian M. Prudente, 97 MAS
TSgt Donald E. Granger, 53 MAS
TSgt Shelley L. Kelley, 62 TAS
SSgt James P. Walton, 41 TAS

Maj John G. Taylor III, Det 7, 37 ARRS
Capt Dale J. Cook, HQ ARRS/DOVE

(ranks and units are those at time of award).

We Flew When the Birds Walked

by Cecil C. Pine

This article traces the development of the "double-cue" flight director system during 1948-1951. Primitive by today's standards, the Sperry instrument called the "zero reader" was designed to keep an aircraft on the flight path or glide slope when its two needles were kept centered. The "zero reader" and the crews and engineers who first developed and operated it, helped usher in modern, all-weather instrument flight. —Ed.

It was late spring in 1948 that we thrust ourselves headlong into the project of building a totally new flight director system at the Sperry Flight Research Facility located at MacArthur Field on Long Island. This new piece of avionics was called the zero reader. We would shortly be testing the zero reader in low ceiling (including zero-zero) weather in flight tests. As a Sperry engineer I was responsible for the installation of cameras and recording equipment in the plane. Rube Snodgrass, Sperry test pilot, conferred with weather bureau officials to obtain historical weather statistics for the New York area. Bob Roe, chief of the Sperry flight research facility, contacted a flight team that was testing airport lighting systems out in foggy Arcata, California.

"Sperry 099," a Douglas C-47 "Gooney Bird," was selected as the plane for the project. We made about a dozen shake-down flights in good weather. We checked flight recorders that registered airspeed, altitude, bank and pitch. Our cameras onboard would capture the pilot's-eye-view through the windshield. These flights also brought the autopilot and the zero reader flight director into perfect pitch.

"The Black Hole"

After our shake-down flights were completed, we had to wait another couple of weeks to catch the first low-ceiling flight of the project. The Weather Bureau had predicted early morning fog and I was delighted when it took me half an hour to make the 10-minute trip to the airport. Bob Roe took the left seat and Eddie Williams held down the copilot spot. I was at the forward flight test station just behind the pilot while Tom Wright, one of the flight engineers, took care of the recorders in the cabin.

With the ground check completed, Bob adjusted the zero reader and headed the plane down the runway into a solid wall of fog. We inched off the runway and climbed smoothly to 2,500 feet where we broke out into a beautiful sunlit morning.

We swung around and flew to the outer marker. After a procedure turn, we burrowed our way into the blanket of fog, heading for the runway. Two hundred feet—100 feet—no sign of pavement. At 50 feet Bob yelled, "Where'd the runway go?" All we could see was a circle of black macadam about 100 feet in diameter floating under the plane. We knew we were over the runway, but with no markings to give us visual clues, landing would have been a hit or miss proposition.

After a half dozen tries, Bob gave up and went for a joy ride, skimming over the billowy sea of fog out toward Montauk Point. The sun finally broke through and we landed after the "pea-soup" began to burn off. We nicknamed the phenomenon we'd encountered the "The Black Hole of MacArthur Field."

Bob had read something about a Dr. Calvert who was experimenting with runway markings in England. He shot off a cablegram and received in return a report, complete with diagrams. Too excited to wait for professional contractors, Bob had the entire crew out hand-painting the runway markings.

The pattern consisted of a series of closely spaced bars at the threshold or landing end of the runway. The successively diminishing numbers of bars were spaced at 500-foot intervals. A heavy double stripe, much the same as a highway

marking, completed the picture. The design was such that pilots, catching only fragmentary glimpses of the pattern, could determine their position along the runway by counting the number of bars as they flashed by. The center stripe provided the necessary guidance during the landing roll.

With the cooperation of the weatherman, we soon had movies of landings under actual low-visibility conditions. The results were impressive, and the "Black Hole of MacArthur Field" faded into history.

Armed with recorded flight data, Bob Roe finally convinced government officials to let us try our low-weather wings at other airports along the East Coast. Our waiver permitted us to fly into these airports when they were closed to all other traffic.

At the mere mention of bad weather, we were out poking our noses into the airports around the New York area, ranging as far inland as Reading, Pennsylvania. On one flight into Idlewild (now Kennedy) the tower operator, unaware of our waiver, issued us a citation for landing when they were closed because of zero-zero weather conditions. Bob had the "pink slip" (general aviation jargon for an FAA violation) framed and proudly displayed it over his desk.

The Unforgettable Flight

The first nine flights of the project proved the value of the automatic pilot and zero reader flight director and had brought us up to the early part of 1951. It was the last day of January when dark, scudding clouds began to push in from the Atlantic. The ceiling was 2,000 feet at MacArthur when we took off. Rube and Bob were in the front seats, Tom Wright was back in the cabin, and I manned the forward flight test station. By the time we passed over Coney Island, we had the report that Newark airport was closed. Rube changed course and called Newark for clearance to land straight in.

A voice crackled through the radio static, "Sperry 099, this is Newark. You're cleared to land and we've got a good one for you. Ceiling zero, visibility zero, with surface winds northeast at four miles per hour." We were at 1,500 feet, coming up on the outer marker, when Tom got on the intercom and shouted, "Look dad, no wings!" I shot a glance out the side window. Barely 20 feet of the 40-foot wing was visible.

We'd captured the localizer beam and were about to latch onto the glide slope when we encountered extreme turbulence. The turbulence eased at 800 feet and our instruments told us we were in the groove. Down we came, 300—200—100 feet. No sign of approach lights, threshold, or runway!

"I'm taking her around," Rube shouted as he set the zero reader for go-around, hit the throttles, and clawed for some altitude.

We fought our way up through the bone-crushing wind shear and headed back to the outer marker.

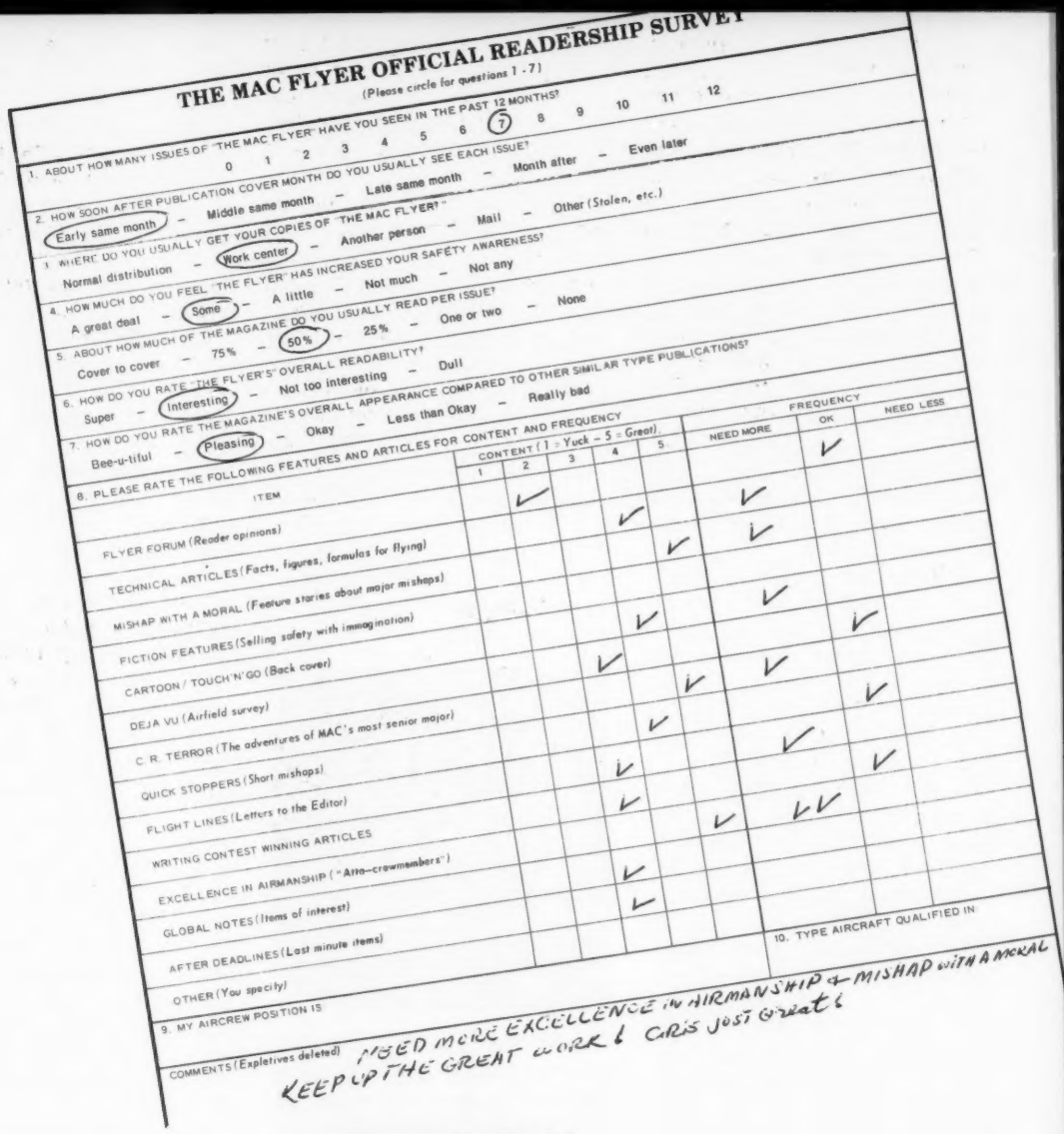
The second time around went a little smoother, but still no runway. On the third try, we were down to 50 feet when we got a glimpse of the ground and a sight we couldn't believe. Just ahead of us was a flock of forlorn, rain-drenched sea gulls, slowly walking across the runway. We finally landed after the fourth approach, taxied up to the terminal building, and went in for a cup of coffee. When the weather began to clear, we hopped the 50 miles back to home base. We thought of the whole thing as just another routine flight—for Sperry 099 and crew.

The next day an account of our flight hit the press with headlines: "Sperry Flies While the Birds Walk." With that kind of publicity, our all-weather program was really off the ground.

The Air Navigational Development Board gave us a contract to fly 500 low-weather flights to test advanced weather-measuring instruments developed by the U.S. Weather Bureau. Management looked kindly on our request for funds to develop new and better aircraft instruments and controls. Scholarly reports were published on wind shear, instrument landing standardization, and improved weather-reporting procedures.

And finally, almost 20 years after Bob Roe first initiated the Sperry all-weather flight program, one of his fondest dreams came true. On the 27th of February in 1967, a Pan American Airlines Boeing 727 equipped with Sperry instruments and controls made a fully automatic, hands-off landing at Kennedy International. It was the first authorized automatic landing for a commercial carrier in routine service.

—adapted from *Air Line Pilot*



THE MAC FLYER OFFICIAL READERSHIP SURVEY

(Please circle for questions 1 - 7)

1. ABOUT HOW MANY ISSUES OF "THE MAC FLYER" HAVE YOU SEEN IN THE PAST 12 MONTHS?
0 1 2 3 4 5 6 (7) 8 9 10 11 12

2. HOW SOON AFTER PUBLICATION COVER MONTH DO YOU USUALLY SEE EACH ISSUE?
(Early same month) – Middle same month – Late same month – Month after – Even later

3. WHERE DO YOU USUALLY GET YOUR COPIES OF "THE MAC FLYER?"
Normal distribution – (Work center) – Another person – Mail – Other (Stolen, etc.)

4. HOW MUCH DO YOU FEEL "THE FLYER" HAS INCREASED YOUR SAFETY AWARENESS?
A great deal – (Some) – A little – Not much – Not any

5. ABOUT HOW MUCH OF THE MAGAZINE DO YOU USUALLY READ PER ISSUE?
Cover to cover – 75% – (50%) – 25% – One or two – None

6. HOW DO YOU RATE "THE FLYER'S" OVERALL READABILITY?
Super – (Interesting) – Not too interesting – Dull

7. HOW DO YOU RATE THE MAGAZINE'S OVERALL APPEARANCE COMPARED TO OTHER SIMILAR TYPE PUBLICATIONS?
Bee-u-tiful – (Pleasing) – Okay – Less than Okay – Really bad

8. PLEASE RATE THE FOLLOWING FEATURES AND ARTICLES FOR CONTENT AND FREQUENCY

ITEM	CONTENT (1 = Yuck – 5 = Great) 1	2	3	4	5	FREQUENCY NEED MORE	OK	NEED LESS
FLYER FORUM (Reader opinions)		✓					✓	
TECHNICAL ARTICLES (Facts, figures, formulas for flying)				✓		✓		
MISHAP WITH A MORAL (Feature stories about major mishaps)					✓	✓		
FICTION FEATURES (Selling safety with imagination)				✓		✓		
CARTOON / TOUCH 'N' GO (Back cover)							✓	
DEJA VU (Airfield survey)			✓			✓		
C.R. TERROR (The adventures of MAC's most senior major)					✓		✓	
QUICK STOPPERS (Short mishaps)				✓		✓		
FLIGHT LINES (Letters to the Editor)				✓			✓	
WRITING CONTEST WINNING ARTICLES				✓		✓✓		
EXCELLENCE IN AIRMANSHIP ("Atta-crewmembers")					✓			
GLOBAL NOTES (Items of interest)				✓				
AFTER DEADLINES (Last minute items)				✓				
OTHER (You specify)								

9. MY AIRCREW POSITION IS:

10. TYPE AIRCRAFT QUALIFIED IN:

COMMENTS (Expletives deleted) NEED MORE EXCELLENCE IN AIRMANSHIP & MISHAP WITH A MORAL
KEEP UP THE GREAT WORK & CRIS JUST Great!

Overall Q-1!

TMF Checkride

Every two years, we ink-stained wretches here on the *Flyer* staff are required to survey you, our readers, to see if you think we're doing our job. We're also required to publish the results of that survey in the magazine. You might say it's a checkride of sorts and you are the flight examiners or, in this case, the "magazine examiners." Anyway, we mailed our surveys to a representative sampling of MAC units, both stateside and overseas.

We were very encouraged by the final survey results. In fact, you might say you, the readers, awarded us an overall qual-level 1. You were

pleased with both appearance and readability. You also told us which features you liked best and which you liked least. You told us how often you read *TMF*, where you found it and, more importantly, how much we raised your safety awareness—our primary responsibility. In all, the results were both satisfying and informative. Some of the comments were gratifying, too.

From the Top

In our sampling, the first thing we wanted to know was how many copies of *TMF* you found in the last year. Twenty-nine percent answering our survey managed to find all 12 copies, and 57 percent found 7 or more out of the last 12 issues. Only 30 percent could find 5 or fewer copies of the last year's distribution. Where and when you received a copy of "our baby" is just as important to us as how many you found. Most of you (67 percent) pinpointed your work center as the spot where you found *TMF*. The other 33 percent received it through normal distribution. By the word "other" in this section, many of you indicated the latrine was the "in place" to read *The MAC Flyer*. As long as the message gets across, *anywhere* is "the right place" to read *TMF*. Finally, 68 percent answering our survey saw the magazine the same month it was distributed.

Safety Awareness

Our basic purpose is to increase safety awareness by facilitating changes in behavior through the printed word. In other words, if you take *TMF* to heart and realize that its message is from fellow crewmembers who are interested in keeping you alive and well, then we will decrease human factors mishaps. And most of you responding to our questions think we are doing our job, and succeeding quite well as it turns out. In fact, almost 3 out of every 4 (71 percent) thought we increased command safety awareness either "a great deal" or "some." Coupled with the nearly 20 percent who thought we raised safety awareness "a little" nearly 90 percent—9 out of 10—think we're doing our job.

Most read—Least read

This part of our survey was very interesting, though not totally surprising. You selected "Mishap with a Moral" as the most popular feature in *TMF*. And because of that response, we'll be sure to publish "Mishap with a Moral" each and every month. Coming in a close second was, you guessed it, that Aviator with Avoirdupois—C.R. Terror! Many of you wanted to see even *more* of the Rhinestone Flyboy, but even though he's great (just ask him), we feel once each issue is just about as much as the old boy can handle. The Magnificent Major's illustration may, however, appear elsewhere in the magazine.

Coming in a close third and fourth, respectively were "Touch 'n' Go" and/or "captioned illustrations" (also called cartoons) on the back cover and, "Quick Stoppers." As always, we welcome illustrations or ideas for illustrations for the back covers. We also welcome, and will publish credit lines, with any personal photos we use—with an airlift safety theme of course.

One of the surprises we discovered from this year's survey was the instant popularity gained by a fairly new feature, "Excellence in Airmanship." We know the value of these vignettes and, as long as we have inputs from the field, we'll try to print them as soon as they are processed. If you'd like to know how to submit a worthy aircrew, check your MACR 900-3.

There were also many comments too numerous (or too explicit) to print. Most of the comments we received were in the vein of "keep up the good work," or "best safety magazine I've read." With that mandate, and your continued support, we'll continue to put out the best safety magazine possible—and one that's primarily *by* crewmembers, *for* crewmembers. We did receive some comments from enlisted crewmembers who felt we were too "officer oriented." We'd love to publish more material from the enlisted crewmember perspective, but we have a difficult time getting "inputs" from flight engineers, loadmasters and PJ's, and others who play such a vital role in the MAC mission. So give us your ideas, or better yet, write us a story on the flying safety side of enlisted life, and you'll see it in the *Flyer*. We highly encourage all to enter the annual MAC Flying Safety Writing Contest currently underway.

Keep in mind, though, that even though your literary masterpiece may not win the grand prize, it may still be published in *TMF*. If you think that what you have to say is important enough to write down—if it may save someone's life—then so do we. And we'll give it a chance if you will.

Summing everything up, we were pleased; our boss was pleased; his boss was pleased; etc. But most importantly, *you* the readers, were pleased with our efforts. Even though we call it "our" magazine, it's really "your" magazine—and we'll keep publishing "your" magazine as long as you keep reading it.

Mishap with a Moral

UP and LOCKED

Readers familiar with the "Mishap with a Moral" feature may miss our usual in-depth discussion of the "why" behind the more obvious cause factors. But instead of keying on things like distraction, cockpit workload, visual illusions, fatigue, etc., we felt in this case, the emphasis belonged on the less than professional actions by some of the crewmembers involved. This is the most evident moral any of us in the flying profession can derive from this particular mishap.—Ed

For over an hour, the C-141 night local training mission was taken up with various routine approaches and touch and go's. The weather had been deteriorating throughout the evening with the tower reporting a ceiling of 400 feet and 5 miles visibility in fog. Following a full stop landing for multiple pilot position changes, the instructor pilot was in the right seat and a young lieutenant copilot occupied the left. Another aircraft commander sat behind them in the jump seat. Rounding out the crew was an experienced first engineer in the navigator's seat and a recently qualified second engineer manning the panel.

With everybody strapped in and ready, the left-seater began taxiing the Starlifter into position for takeoff. Aware that the lieutenant was entering training for his first-pilot upgrade, the IP proposed that the first approach be accomplished on three engines.

"Sure, why not?" agreed the upgrade candidate, perhaps seeing an opportunity to demonstrate his prowess early in the ride with a simulated emergency.

"Okay, then," added the IP, "I'll request a PAR."

At this point, the first link in the chain of events leading to a mishap was forged. Although the airfield was IMC at night, the IP planned to do a practice three-engine approach—a clear violation of regulations.

Takeoff went smoothly, and the IP retarded number four throttle as the Starlifter neared 1,000 feet in order to begin the engine failure simulation. Using the horn silence button to still the landing gear warning horn, which came on the instant the throttle was near the "idle start" position, the crew continued on the downwind leg and requested radar vectors to an approach-flaps PAR. On downwind and base, the crew briefing and approach checklists were accomplished. As the left-seater banked the Starlifter onto the dogleg for final, the IP discovered he could no longer transmit properly with his headset. Turning radio duties over to the pilot at the controls, he began swapping equipment with the pilot in the jump seat and the first engineer at the nav station.

We pause once again in the narrative to point out that two more links in the accident chain had now been added to the first. Having elected to fly an approach-flaps PAR, and then silencing the gear warning horn after retarding number four throttle, the IP had effectively removed any chance for an audible alarm. As long as none of the other throttles were retarded to within an inch of the

idle stop, the gear warning horn would not sound. The glowing light in the gear handle provided a visual reminder throughout the approach, but it was ignored in the apparent preoccupation with, and confusion over, the IP's headset problem. With the headset swap in progress, checklists and standard operating procedures, not to mention caution, were abandoned. The two "junior partners" aboard were left in control of the aircraft to fly a PAR and accomplish the necessary before-landing checklist items by themselves, while on short final. With the left-seater totally occupied with flying, and the novice engineer at the panel continuing his paperwork and fuel transfer, and waiting for somebody to call for the before-landing checklist, it never got done. The aircraft configuration? Flaps approach, Gear UP!

Around 500 feet off the deck on final, the IP finally got his headset problems resolved. He announced he was rejoining the proceedings, and without bothering to check anything, called "minimums" and "land." Neither pilot reported the gear "down and locked" as required by AFR 60-16. They also failed to respond to the gear check reminder by the final controller before his "clearance to land."

Remember, in addition, the gear handle was still glowing its visible warning even though its audible alarm had been silenced earlier.

Looking up from his calculations about the same time the Starlifter was in the flare, the panel engineer realized they were about to land, spotted the glowing gear handle and called, "Pull up, pull up!" Almost simultaneously, everybody else in the cockpit realized what was happening and called for a go-around. The left-seater, whose first indication of something wrong was a seat-of-the pants sense that the big bird was settling too much as he felt for touchdown, had already begun adding power to take it around. Unfortunately, he was too late. Before the TF-33's could take hold, all five crewmembers aboard felt and heard the sickening scraping sound as the Starlifter's belly momentarily ground along the runway.

Luckily, the C-141 became airborne again almost immediately. The crew initiated a Conference Skyhook and checked for damage. After dumping fuel and lowering and pinning the gear, they came back in for a safe landing, even though the airplane had sustained serious structural damage.

Discussion

Once again, this mishap goes to prove that the unlikely should certainly never be considered the impossible. One thing is painfully obvious—from the outset there were too many "dumb" mistakes including violations of regulations, disregard for tech order procedures and a lack of good judgment and crew discipline. Reconsider the following:

1. The practice three-engine approach should not have been planned or executed in night IMC.

2. The gear should have been lowered and the "before landing" checklist accomplished on downwind. Also, gear status should have been checked and reported before landing.

3. With a communication problem in the cockpit, the IP should have initiated a go-around or called for a holding pattern until he was equipped to handle both right seat and IP responsibilities properly.

MAC is a professional command performing a vital service to our country. Our users and passengers expect professional airmanship. Our self-respect as dedicated airmen demands that we exercise professionalism in everything we do. We cannot condone in ourselves—or in others who are members of our profession—noncompliance with directives and established procedures, or thoughtless or careless acts. Under no circumstances can we allow blatant violations of regulations and inattention to duties to take place during any of our flying missions—whether they are conducted in the local pattern or half-way around the globe.

Left to right: Capt Enrique A. Oti, IP; and Maj Howard E. Lantz, AC.
Not pictured MSgt Clifton M. Strickland, FE.

Captain Oti and crew, 67th ARRS. While on a routine training mission (PAR downwind in IMC) near RAF Woodbridge, England, the number 4 prop low-oil light of the HC-130 illuminated. Capt Oti, an instructor pilot in the right seat, visually confirmed hydraulic fluid pouring from the number 4 propeller housing and Maj Lantz, in the left seat, directed the engine shutdown. Backed up by the flight engineer, MSgt Strickland, Capt Oti pulled the number 4 condition lever to feather the prop. The errant prop didn't feather, but instead went to a flat blade angle, increasing rpm, drag and noise. The HC-130 suddenly yawed right in a violent maneuver as the number 4 prop went "flat" requiring both pilots to exert maximum force on the left rudder pedals to maintain a semblance of controlled flight. Maj Lantz also applied asymmetrical power to help keep the rescue Herk under control. Meanwhile, Capt Oti pulled the fire emergency control handle in an attempt to feather the uncontrollable prop. Still, nothing happened. Declaring an emergency, the crew turned final for a full stop PAR. With cockpit communications almost impossible and the weather deteriorating rapidly, Maj Lantz continued the approach while Capt Oti and MSgt Strickland completed the clean-up and before-landing checklists. With the prop torque at *minus* 8,000 inch-pounds, Maj Lantz, with Capt Oti also on the rudders, skillfully completed the approach and landing. A few minutes after touchdown, the propeller finally stopped. Their excellence in airmanship overcame a very hazardous situation occurring in marginal weather conditions and at low altitude.

Captains Boyd and Johnson. Starting off on a normal airlift support mission from Andrews AFB to Otis AFB, Massachusetts, the Det 2, 1401st MAS crew had reached cruise altitude with no

Left to right: Capt George E. Boyd, IP; Capt Stephen M. Johnson, CP.

problems. Enroute, though, the VHF radio and IFF transponder quit. Then the cabin pressurization went out at 20,000 feet in the descent, but stabilized at 11,000 feet. Next, the Sabreliner entered light icing and moderate rain. Moments later, the CT-39A lost all electrical power while on radar vectors to an ILS at Otis. Now, unable to communicate with the ground and without fuel crossfeed valves for wing tank balancing, flaps, trim or hydraulic pressure, the crew took immediate action. Realizing the coast was near with it's corresponding lack of obstructions, the crew descended in IMC with minimum attitude and control instruments. Breaking out barely 400 feet over the water, they spotted the runway at Otis, made a low pass over the tower and received a green light for landing clearance. Pulling up into a closed pattern, the crew lowered the gear using the emergency gear lowering procedure. They made an uneventful landing on a wet runway, minus the antiskid and electrical power. Thanks to the outstanding airmanship of these two professionals, six lives and a valuable aircraft are still with us today.

Captain Murphy and Lieutenant Rutledge. This Det. 4, 37th ARRS crew was on a priority three exercise to a Titan II missile complex. Second Lieutenant Rutledge was flying the HH-1H on final approach to the helipad. As he attempted to increase power, both engine and rotor rpm started a rapid decrease as the low-rpm warning light and audio came on. Barely 200 feet above the pines, Capt Murphy immediately took control and entered autorotation. Both pilots confirmed a lowside governor failure. Without a second to spare, Capt Murphy and 2d Lt Rutledge accomplished manual fuel procedures—their only chance to save themselves and their craft. To enter manual fuel, the throttle must be rolled to flight idle, the governor switch changed to the emergency position and then the throttle must be advanced to the normal operating range before power can be increased. This procedure was completed in absolute minimum time and the crew returned the Huey to level flight barely 50 feet above the trees. A short flight to a nearby airport ended in an uneventful manual fuel approach and landing. Capt Murphy and 2d Lt Rutledge's quick and effective teamwork, with no margin for error or hesitation, saved a valuable aircraft, and more importantly, an invaluable crew.

Capt H. Scott Murphy, IP.

2Lt Paul K. Rutledge, CP.

The MAC Flyer

1982 Flight Safety Calendar

JAN

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

1 New Year's Day

The new year also brings winter flying hazards.

Let's resolve to keep the MAC flight mishap rate below 1 in '82.

MAC Safety Awards Board meets—
Winners announced when judging is completed.

USAF Safety Award Nominations due.

FEB

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15 Washington's Birthday

Flying Safely — Do it for the ones you love.

Unit NSC award nominations due.

MAR

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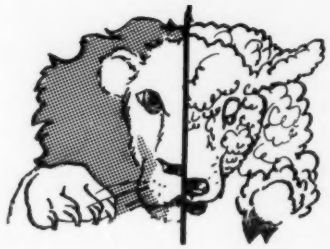

MAC Flying Safety Writing Contest ends.

APR

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31 Memorial Day

JUN

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Birds begin spring migration.

Give thunderstorms a wide berth.

Remember where lightning is most often encountered.

JUL

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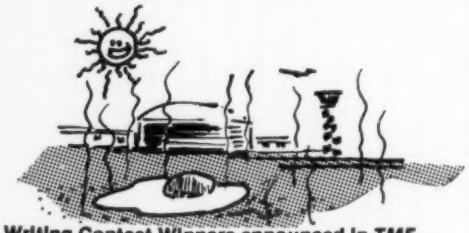
4 Independence Day



Writing Contest Winners announced in *TMF*.

Declare your independence from complacency.

Hot weather takes its toll in aircraft performance.

AUG

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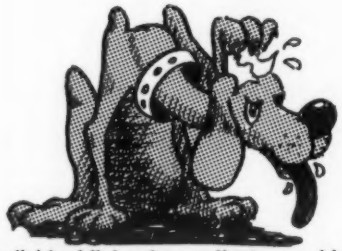

Check for individual flying-hour milestone achievers each month.

Units order new safety awards supplies.

SEP

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6 Labor Day

Transition from summer to fall brings a mixed bag of weather hazards.

OCT

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11 Columbus Day

Fall migration of birds in full swing.

NOV

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11 Veterans Day
25 Thanksgiving

MAC Flying Safety Writing Contest opens.

DEC

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26	27	28	29	30	31	

25 Christmas

MAC Safety Awards nominations due.

Call in unit flying hours to HQ MAC IGFE (AV638-3534).

Happy and safe Holidays!

Low-level flyers beware the . . .

Hidden HAZARDS

by Major Jerry T. Vining
439th TAW (AFRES) Westover AFB, Mass.

Now that we in MAC routinely fly airdrop routes at altitudes down to 300 feet AGL, we must become even more aware of the common hazards associated with low-level flying: trees, hills, buildings, powerlines, towers, etc. There is, however, another peril that has received almost no formal attention in any of our tactical flying courses. This is wind and terrain-induced turbulence—the kind found near hilly or mountainous terrain. The scientific name is orographic turbulence, and it's downright *dangerous.* This invisible menace not only increases structural fatigue and causes serious aircraft damage, it can force an unsuspecting crew right into the ground. The lower our altitude, the less time we have to react to the effects of orographic turbulence. So, the more we know about it, the safer we'll be able to fly "down in the dirt."

Ridges and Winds

Have you ever flown over a familiar ridge and noticed how effortlessly your flying machine climbed as the aircraft ballooned over the top? Then, a while later, you flew over the same hill only to notice, with some wincing, that your beast labored all the way and barely made it over the ridge. After swallowing the apple-sized lump in your throat, did you ever wonder why? Why did it seem so easy to crest the top first and then barely make it over on the second go round? "Well, it was probably just a 'pig.' Yeah, that's it. The plane was just a 'p-i-g .' "

So the next day you're scheduled to go "do it again." You and your trusty beast, different tail number, are terrain masking at 300 feet AGL over some pretty rugged countryside. You're thinking to yourself, "Nothing to it." Suddenly, you find the vertical velocity indicator (VVI) pegged at around 2,000 feet per minute—*down.* You cob in the power and raise the nose. Luckily, you finally level off at what seems like inches above the ground and wonder, after a brief moment of "thank heavens," why it happened? What was pushing you into the ground?

If you're like most crews and spend at least some of your time in the 300 foot vicinity, your training and "real" experience has been conducted over broad flatlands or low, rolling hills. If this is the case you probably are of the belief that it's all the same. "Just don't fly into any rock-filled clouds. Right?" Again, not necessarily so. If rough or mountainous terrain flying was just like flatland flying, we wouldn't give our helicopter pilots specialized training in that type of terrain. You see, the difference between flatland or rolling hills flying at 300 feet and rugged terrain or mountainous flying at that altitude is *wind effect.* Wind blowing over and around rough or mountainous terrain can drastically change the picture—possibly for the worst. You may only get a little turbulence, or you may catch the full brunt of an 80 knot downdraft! Your real concern is knowing where the turbulence is and how severe it is.

At low levels near rough terrain, air moves vertically, horizontally and in eddy currents creating new and dangerously different turbulence from the type you may have encountered at FL 290 and above. The only thing you may have experienced at 500 feet or below that may be similar

to orographic turbulence is low altitude wind shear in conjunction with a thunderstorm. But the effects may be the same: loss of aircraft control too close to the ground to recover.

What, How and When

Orographic turbulence can occur at any time. Basically, when winds blow perpendicular to a mountain range with a velocity of 25 knots or more, you can expect mountain wave turbulence. And talk about a "Rocky Mountain High," mountain wave turbulence can extend up to 70,000 feet and as far as 300 miles downwind from said mountain range. Vertical air turbulence near rugged mountains has been measured at 3,000 to 5,000 feet per minute and that force may be enough to exceed your particular aircraft's structural limitations. The interesting fact is, it takes only 25 knots of wind to create a mountain wave danger. Think about it for a moment. You frequently fly through 25-knot winds and think nothing about the possible danger. But the main thing to remember is that the *potential* for significant turbulence is greater when the wind is blowing and you are flying near the surface.

"See" and Avoid

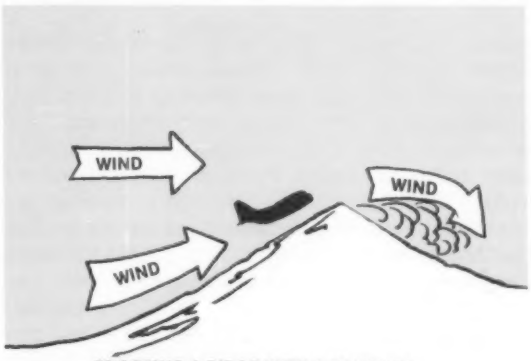
There is no trick to avoiding orographic turbulence. All it takes is some knowledge and some common sense and you can even use the available terrain to your advantage. Answering these three questions will put you on the right track:

- What is the wind direction and approximate velocity? (Light, moderate, strong)
- How will a tailwind affect me as I fly over this terrain?
- How will a headwind affect me as I fly over the same terrain?

Now that you have the questions, all you need are the answers. Right! Coming up! The "trained eye" can predict and help anticipate the answers to these questions. To help "train your eyes," here are some techniques you can practice on your next low-level flight.

You can determine the wind direction and approximate velocity by observing smoke, water, dust or even wash hanging out to dry. Determining direction is no problem. Determining velocity, though, is a little more difficult. If smoke is rising nearly vertically, then the winds are light. If the wind is moderately strong, you'll notice the smoke rising at an acute angle. Smoke blowing almost parallel to the ground indicates winds that are, you guessed it, very strong.

Now if you happen to be over a lake, inlet or similar body of water close to a mountain range, it may be still more difficult to figure out the speed and direction of the wind. The easiest way to judge wind direction is to compare your aircraft heading with the direction of wave movement. For example, if the waves appear parallel to your direction of flight, you have a crosswind. If the wave crestlines are perpendicular to your direction of flight, you have a headwind or tailwind. Also, the foam from any whitecaps will appear to slide back *into the wind,* giving a clear indication of direction. The U.S. Navy uses the Beaufort Scale to estimate wind velocity,but here is a simplified scale:



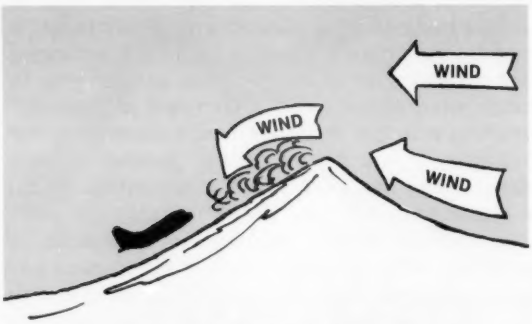
CROSSING A RIDGE WITH A TAILWIND

- Smooth water to fully developed waves . . . less than 13 kts (light wind).
- Waves beginning to white-cap . . . 13 but less than 30 kts (moderate wind).
- Full white-cap with blown spray . . . 30 kts or greater and pronounced wind streaks paralleling wind's direction (strong wind).

Obviously, a good weather forecaster and a good navigator are your best sources of wind information coupled with a good doppler and/or INS. The techniques mentioned above can be used to update their data and give on the spot wind information at a glance.

Clouds can also be helpful if you can "read" them. Take a good look at the clouds which form near the tops of hills or mountains. Their shape and direction of movement will be good indicators of both wind direction and velocity.

Moisture-laden air cools as it rises and condenses to form clouds near the tops of mountains. These clouds travel downwind from the



CROSSING A RIDGE WITH A HEADWIND

peaks and frequently form long rows of clouds called "cloud streets." Cloud streets will point downwind from the peaks where they form. Soft billowy clouds will indicate light winds and little turbulence. Thin stratus clouds pointing straight away from the peaks, however, indicate strong winds and potentially dangerous turbulence. These lenticular or laminar-shaped clouds are the real danger signals for you. They shield the most dangerous severe turbulence beneath their formations on the downwind side of the terrain. Remember, if you see clouds like these you can expect winds in excess of 25 knots and severe turbulence.

"Great," you say. "Now I'm ready to fly."

Tailwind vs Headwind

Who said anything about being ready to fly? You still have a couple more answers to discover before you'll be ready to launch. These are techniques, but techniques which work and are tried and proven. So, just on a guess, which would you say is more beneficial, a headwind or a tailwind?

If you say tailwind, congrats! The safest way to cross rough terrain is with a tailwind. Why? Because with a tailwind, you'll ride the updrafts as you approach the ridge. With the dominant airflow upward, you can safely "snuggle down" closer to the ridge, if necessary, to prevent detection. You will have a tendency to "balloon" over the ridge, and the stronger the wind, the greater will be the "ballooning" effect. Anticipate this and attempt to cross the ridgeline at a 45 degree angle.

What about turbulence with a tailwind? Take a good look at the terrain on the ridge as you approach it. If it is relatively smooth, there will be a little turbulence even with strong winds. If the ridge is very rough, on the other hand, and the winds moderately strong, you can expect some light to moderate turbulence, but the dominant airflow will be up. There will be little danger from downdrafts.

Now let's talk about the effects of headwinds. If you fly toward the ridge into a headwind the situation changes considerably and you could find yourself directly in the downdrafts and turbulence. You can expect both downdrafts and turbulence to be directly proportional to the wind velocity and ruggedness of the terrain. Remember, a wind in excess of 25 knots is your signal for increased vigilence. In this case you must increase your safety margin. You'll need additional terrain clearance as you near the ridge. This particular situation becomes more critical if you have misjudged the height of the ridge and if you have to sacrifice airspeed for climb performance. Now you could find yourself in real trouble. You may arrive just below the ridge crest (where turbulence and downdrafts are strongest) fresh out of airspeed, altitude and ideas. Catch a good down draft now and you'll be on the elevator going down! Every kind of aircraft in the inventory has been victimized by the kind of orographic turbulence described in this scenario including MAC types.

Planning Tips

The catch phrase to prevent something like this from happening to you is "keep everything up." Start with your head and go to your altitude, airspeed and engine power. Keeping your head out of the cockpit will, or should, maintain your awareness of what's going on outside—remember those hints about wind speed, direction and proximity to the ground. If you're flying lead, to keep yourself and your cohorts out of trouble, you might want to think about increasing your airspeed before you arrive at the rapidly approaching ridge. Keeping your "maneuvering momentum" up is another way of putting it.

The basic rule is to beware of rugged terrain plus headwinds. Their sum equals nothing but trouble. Altitude plus energy, together, will make things a lot easier.

The last case is corrective action should you misjudge elevation, terrain or winds and cannot clear the ridge. If you have maintained your energy level and have given yourself a little edge on altitude, you can turn away from the ridge. To do

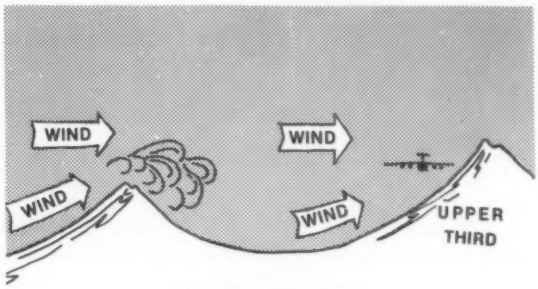
this, you're going to have to pull some Gs and trade your extra airspeed for altitude. You'll want to quickly bank away from the ridge toward lower terrain and get your flaps down as soon as possible to increase your stall margin. Detailed techniques should come from your stan-eval and/or tactics shop.

So, if you must cross rugged terrain for any reason and you have a choice, cross with the wind behind you and pushing you up the slope. Try to plan your crossing where the terrain is less rugged, thus reducing the possibility of strong turbulence and fewer downdrafts. If you must cross rugged terrain with strong headwinds, keep everything UP! Especially critical are your altitude and airspeed, or "maneuvering momentum." At the first sign of trouble, make a maximum performance "climb" toward the lowest terrain and follow your best radius of turn procedures and techniques.

Down in the Valley

So far, one element of rough terrain flying has been ignored. You probably noticed there were no valleys in these mountains. Valleys, as we all know, are excellent for terrain masking and navigating to the DZ or LZ. The question is how to fly a valley to give yourself the greatest safety margin and the greatest terrain masking? With calm winds, the problem is simplified. In this case, you need to evaluate the valley and select the best terrain features to fly over or around. Specifically, look for the rough dark areas where your particular camouflage paint scheme is most effective; where it will best blend in and where your shadow will be less distinct. A very important consideration is what position in the valley will give you the best opportunity for evasive maneuvering should you suddenly encounter enemy "triple A" or SAMs.

Adding some wind to the valley will, of course, add some turbulence. Still, if you can avoid rugged terrain which amplifies turbulence you'll be only a little uncomfortable. Wind blowing *across* the valley is another story. If the threat analysis and terrain masking opportunities are the same, you would want to fly on the far side of the valley away from the wind. If the wind is from the left, you want to fly on the right side of the valley ⅔ of the way up the side of the ridge. In this position, you can ride the updrafts along the hillside and could take full advantage of these updrafts to help you perform your "pop over" maneuver if necessary. If you had to make a 180° evasive turn, you would be turning into the wind, thus shortening your turn radius.



VALLEY FLYING

You should try to avoid flying on the downwind side of the ridge. If you fly the left ridge with the wind from the left, you could find yourself flying right into the worst of the turbulence and downdrafts. If this position is the only one you can use, then move farther away from the ridge toward the valley and increase your altitude as much as possible without exposing yourself. Your level of caution should also increase because the likelihood of a downdraft forcing you down has greatly increased.

Maybe those hidden hazards below 500 feet AGL are a little more "visible" now. Down low, we can learn to read the signals nature provides, and by using them, we can anticipate many dangerous conditions which may be literally "just over the next hill." My hope is that some of the things I have learned in 17 years of civilian and military flying will be of some value to other flyers as we continue practicing low-level operations. And, like the man said, the more you practice, the "luckier" you'll get. So practice flying *safely* and you'll have lots of good "luck."

ABOUT THE AUTHOR

Well versed in the "hidden hazards" of orographic turbulence, Major Vining is a flight examiner with over 3,000 hours of military flying and has flown the H-19, H-43B and HH-3. He has also flown the C-130A, B, D, D-6, E and H as well as the T-33, 37, 38, and 39. A graduate of TERPS and IPIS, Major Vining is currently Senior MAC Advisor to the 439th TAW (AFRES), Westover AFB, Mass.

You Should Have Seen the One That Got Away

by Major Stephen J. Zolock, Jr.
436th MAW Dover AFB, DE

When pilots gather at their favorite watering holes, the subject often turns to the tale of good ol' Joe who "bought the farm." When asked the reason for the catastrophe, the opening line is usually, "He screwed up!" This is usually followed by a discussion of some horrendous error made by poor unfortunate Joe that did him in. In the first dozen or so years of my

Honorable Mention, 1981 MAC Flying Safety Writing Contest

career, I've certainly related my share of these stories. The punch line was always the same—the one single mistake that killed everybody. I guess from the cockpit perspective of things this makes sense. Pilots are usually tougher on themselves than the man in the street would be. They expect themselves to be able to "pull it out" in a tough situation. My entry into the flying safety business about a year ago, however, has given me a different slant on the subject. Looking at the whole spectrum, the totality of people and machines that it takes to get that bird up and down safely, I see now that ol' Joe most likely wasn't done in by the "big booboo," but rather by a whole series of them. To prove to you that this idea just didn't come to me while sitting in a flight-line snackbar somewhere at 2 a.m., let me relate a story from an impeccable source.

As a cocky young aircraft commander in the C-141A Starlifter during the early 70's, I found myself over "the pond" on a routine run to Spain. This was a normally uneventful channel mission which seldom held any surprises. A "piece of cake," as they say. In addition, we had a daylight arrival time at Torrejon AB and the weather forecast was decent. The cruise portion of the trip was proceeding as published, so I rocked my seat back and shot the breeze with my copilot, Hank. About three hours out, I checked the arrival weather through Lajes on HF. Torrejon was calling for a 1,000-foot ceiling with 4 miles visibility in rain showers. Hmmm, I thought to myself, not as good as the original forecast. But as long as there was no thunderstorm activity associated with it I was not unduly concerned.

As we passed over the Portuguese coast I looked down, hoping for a glimpse of the city of Lisbon, always a spectacular sight. Unfortunately, an undercast that ran clear to the horizon prevented me from seeing anything. In fact, that same undercast was still there as I punched off the altitude hold for an enroute descent into Torrejon.

About 40 miles out from the field, Madrid Control handed us off to Madrid Approach Control. I had to smile. When the International Civil Aviation Organization (ICAO) was formed many years ago, it chose English as its official language. Listening to a rather thick accent on the other end of the radio, I was silently grateful. There but for the grace of the ICAO went I. Even so, someone came up on guard for a chat in Spanish so I pushed down my UHF buttons so I could concentrate on approach control with VHF. Now, as every good C-141 jock knows, you can't monitor guard with the UHF buttons down. But it would only be for a short while, I told myself, before we would be handed off to Torrejon tower and some good ol' G.I. English. Besides, with our peak traffic arrival time, I didn't want to miss any calls. I'd pull up the buttons later.

Those red flags that popped up in front of me looked as big as a bullfighter's cape!

The knowledgeable reader at this point might be wondering why there was so much concern over a busy frequency. The answer in this case was simple. About six miles away from Torrejon was Barajas, the sprawling international airport serving Madrid. With its runway alignment roughly perpendicular to that of Torrejon's, it was a controller's nightmare trying to properly sequence traffic into both airports when the wind blew out of the northeast. This bit of knowledge was in the back of my mind as I continued my descent toward the "Soul of Spain." The first error had been made; the first of several that would very nearly cost me my life and those of my fellow crewmembers.

As we leveled at about 8,000 feet, a further weather update revealed the winds to be generally out of the northwest but moving around to the northeast as a front moved through. Madrid announced the active runway at Torrejon as 23, the instrument runway. Nothing different there; we had our approach plates set up for the ILS to 23. Visions of paella and sangria danced in our heads, along with a cold beer that was waiting on us at the crew quarters. Approach control had us on a downwind now, so it was time to get down to business.

I directed Hank to set in the localizer frequency on both VHF nav sets. Unknown to me,

however, was the fact that the set screw on the frequency selector knob of my set had come loose and spun uselessly. I didn't notice this little turn of events because my attention was riveted on another developing situation. Things must have been even busier than I thought over at Barajas because approach control had very neatly vectored me *inside* the glide path intercept point. Error number two! I was now unable to monitor guard or execute a proper ILS in the weather. Meanwhile, Hank came to the rescue! Blissfully unaware of our vector problem—he must not have heard my oaths from across the cockpit—Hank produced a pocket screwdriver intent on performing some one-level maintenance on the troublesome VHF knob. To my misfortune, however, the "ON-OFF" knob lay beneath the frequency selector knob, layercake-wise. Hank, being a husky lad and with his adrenalin flowing, honked down on the screw and succeeded in freezing it to the ON-OFF knob. I think you can see it coming. With a triumphant "hah" he turned the frequency selector knob to the left to set up the localizer frequency and promptly turned off my set! Those red flags that popped up in front of me looked as big as a bullfighter's cape. All I could think of at the moment was to transition to another approach. Not realizing what he had done, Hank stared at me as though I had departed my senses.

As I rolled out of the left bank . . . that plateau practically filled up the windscreen.

Suddenly he said, "Did you hear that?"

"Hear what?" I said, with some irritation.

"Madrid Approach is calling us on guard," he said.

Madrid approach had indeed recovered long enough to realize what was happening and I pulled up my UHF buttons just in time to be told to make a left 360 for another approach. Madrid had also been slow in communicating with Torrejon tower who, unknown to us, had changed the active runway to 05 after the winds swung around to the northeast. I had just punched out of the overcast as I began the left turn. Apparently, the guy in the tower had heard the guard transmission, looked in the opposite direction, and saw me belly up to the runway. Coming up on guard himself, he directed us to disregard approach control, to immediately roll back around to the right and to execute a circling approach to runway 05. Both my finesse and that cold beer seemed a million miles away as my survival instincts came to the forefront.

To further spice up the situation, a 2,700-foot plateau lay about three miles to the east of the runway—the same side on which I was maneuvering. The circling minimums for this approach were about 200 feet *below* the top of the plateau. As I rolled out of the left bank and into the right one, that plateau practically filled up the windscreen. I stood that Starlifter on its wingtip and squeezed inside of it. The remainder of the approach, in a driving rain no less, seemed anti-climactic by comparison. I bent it around final one more time, being careful to stay out of Barajas' approach path, and touched down safely in not-so-sunny Spain.

Later on that evening in the club I gave the day's events some careful consideration. Three serious errors—one on my part, one materiel factor, and one courtesy of approach control—had combined to produce my predicament. Taken singly, they probably wouldn't have disrupted the planned approach to an "uneventful" landing, but together they had systematically placed me perilously close to disaster. In fact, if one could envision a mishap investigator standing up on that plateau watching and listening to all of this, he would have probably remarked, "You should have seen the one that got away!"

ABOUT THE AUTHOR

Graduating from Florida State in 1967, Major Zolock attended UPT at Craig AFB, Alabama. He then flew 170 combat missions in the AC-119G in Southeast Asia. After a tour in C-141's at Charleston AFB, Major Zolock went back to the Far East, picking up an MBA from the University of Hawaii along the way. Presently a Flying Safety Officer with the 436th MAW at Dover AFB, Major Zolock has over 1,400 hours in the C-5A.

C.R. TERROR

The Star-struck Skipper sallies forth in the Shuttle.

"What a beautiful winter storm over the European Alps!" exclaimed C.R., peering out of the forward windshield of the *Columbia*. "Global Weather Central is going to love these pictures we're getting, eh Sammy?"

"That's right, Boss," replied the co-astronaut, "but shouldn't we get back to the mission flight test profile?"

"Nonsense, Sammy," replied the Able Aeronaut. "We've another twelve orbits prior to shuttle reentry. That's plenty of time to program Major Mode 102 into the inertials for reentry. Pacing, m'lad is the key. We've even got enough time to check the thermal protection tiles," C.R. added.

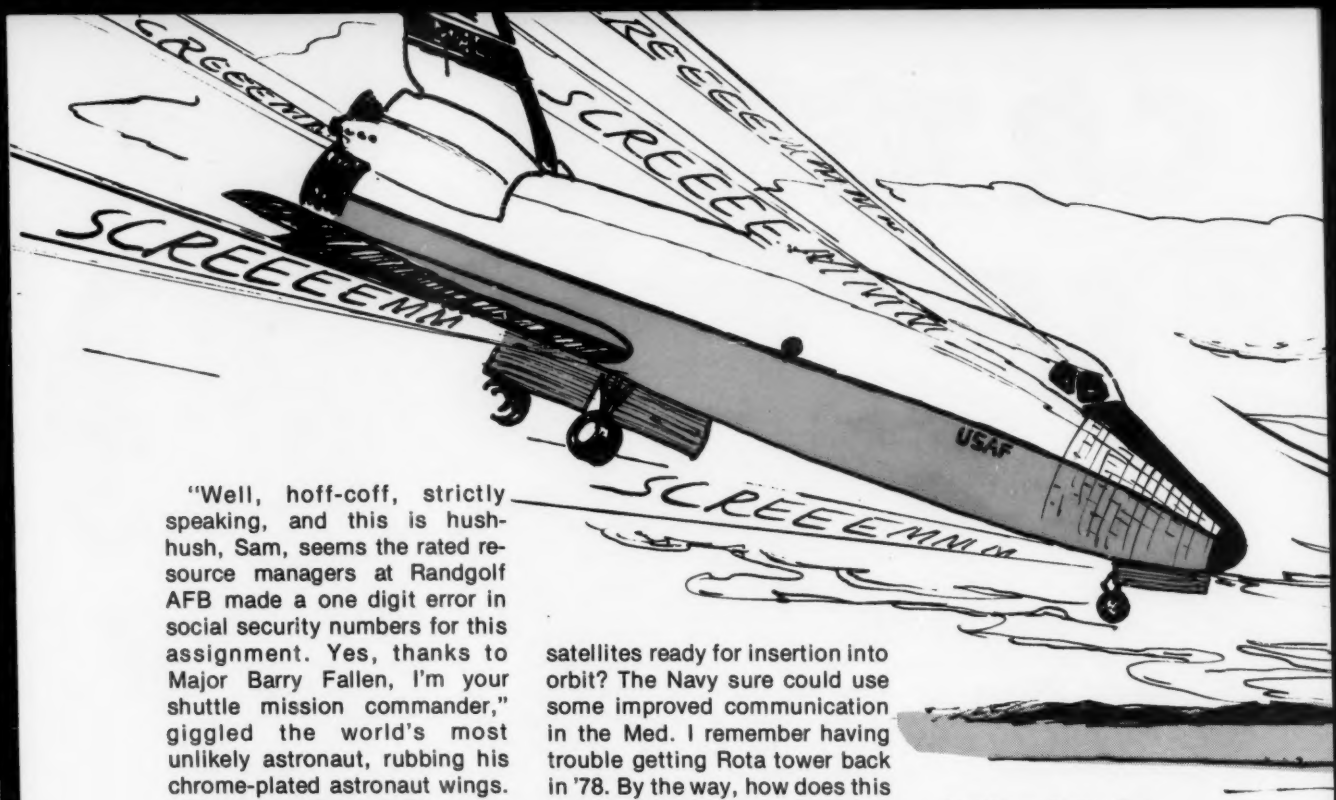
Sam, scratching his head, reached for the "cookbook," the shuttle's technical pubs of launch, orbit and descent procedures. "Excuse me, Boss. Here in Volume 18, it says the reentry computer configuration is Major Mode 304, not 102."

"That's exactly right, Sammy m'boy. Merely a slip of the tongue. Incidentally, Sam, you've got the controls. I'm overdue for my freeze-dried burrito and some Pang. Ya know ol' NASA must have cornered the market on Pang citrus drink. We're getting this stuff with every meal whether we need it or not," insisted the Ace of Aerospace.

"You know, Boss, Ty Downs and I really appreciate getting this space flight. How'd you manage to wangle getting our crew on the shuttle?" inquired the inquisitive mission pilot.

"A good question, Sammy m'lad. Ya know I've had my application in for the astronaut corps ever since April of '63 when I volunteered to become the first MATStronaut. My leadership talents and flying ability weren't recognized at the time, however. But when the DOD shuttle missions started flying, I just knew I was the man of the hour. AFMPC put forth a pool of MAC's finest pilots for the astronaut jobs."

"And they picked you for your expertise in flying various MAC aircraft, right Boss?" chirped the now cheerful Sam.



"Well, hoff-coff, strictly speaking, and this is hush-hush, Sam, seems the rated resource managers at Randgolf AFB made a one digit error in social security numbers for this assignment. Yes, thanks to Major Barry Fallen, I'm your shuttle mission commander," giggled the world's most unlikely astronaut, rubbing his chrome-plated astronaut wings. "Of course, Colonel Fang was delighted and even let me pick my crew. He said that if it would take me away from the squadron and his airplanes, he was for it. In fact, he was hoping I'd get a deep space probe, like to another galaxy," chuckled C.R.

"I guess the DOD would have been happier if we had made an on-time shuttle launch though," commented Ty Downs, the stalwart mission specialist.

"That was certainly my goal," reasoned the Ace of Alibis. I distinctly remember telling somebody to have the crew bus pick us up 30 minutes after alert time. Oh well, we did show two hours after alert—well within my personal tolerances. Of course, it was quite spectacular to have a 12 star launch. My tops back in '74 was merely five colonels and a couple of captains," explained the Rotund Rocketman.

"Sergeant Downs," questioned the Field-grade Fumbler, "Are those Navy comm satellites ready for insertion into orbit? The Navy sure could use some improved communication in the Med. I remember having trouble getting Rota tower back in '78. By the way, how does this jettison release handle work?" queried C.R. as he fumbled with the controls.

"No, Boss, no! Don't touch it," shrieked the junior mission specialist as C.R. opened the payload bay doors and released four satellites into orbit. Aghast at Major Terror's foolish fumble, Ty Downs moaned, "What will we tell the Navy? We were supposed to be 250 miles higher and release those satellites individually in different orbit locations."

"Not to worry, Sarge. The Navy will probably be grateful that they have so much capability over the Atlantic. We'll always be able to get through to Rota now," explained the Ace of Aerospace. "Besides this will give us an opportunity to make another flight in the shuttle to take some more Navy satellites up. Good planning, eh Sergeant Downs? By the way, could you get those payload doors closed? Can't afford to have an untidy shuttle, ya know."

"I'm not sure that mission control will quite appreciate your initiative, sir," muttered the mission specialist as he began the latch cycling process to close the huge cargo bay doors.

"It's about time we got ready for the descent, Sam. Let's make those orbital maneuvering system firings snappy," directed C.R. semi-professionally.

"Roger, sir, deceleration coming up with OMS-1 and OMS-2 burn." Just then, Sammy gasped, "Oh, no, looks like our star tracker is on the blink."

"Have no fear," the Meteroic Major proclaimed. "I'll simply align *Columbia's* platforms with the crew optical alignment sight. My star identification abilities are known throughout the world," he boasted.

Sam remembered how C.R. had "helped" Blinky with his celestial fixes back in '76 when they busted the ADIZ by 85

nautical miles. "Venus is available and very bright," hinted the mission pilot.

After bumping his head on the alignment sight the Squinting Spaceman stared and stared into the eyepiece. After some time, C.R. managed to identify the moon with some degree of confidence and fed the height observed into the celestial computer. "We'll be aligned for reentry in no time," commented the Moon-struck Magellan.

The *Columbia* began its reentry with heat indications of 3000° F at 330,000 feet. "Mach 24.5," C.R. announced. "This beauty moves out just a wee bit faster than our Starlifters used to, eh Sam?"

"Aren't we using up our APU propellant a little fast, Boss? We're supposed to use only one percent per minute for aileron control during reentry. Could we slow down the usage a little?" requested Sammy.

"One thing at a time, Sammy m'lad. After the APU propellant is gone we'll simply use the reaction control system vernier jets," explained C.R. "Now my primary technique in our hypersonic flight regime will be to glide through the reentry using seat-of-the-pants attitude corrections as well as my own proven autopilot finesse. By the way, Sam, did you get a weather update for Vandenmiss AFB?" inquired the Hyperspace Honcho.

"Vandy's reporting 25 percent cloud cover and 10 miles visibility for our landing time," reported the right-seater.

"That'll be perfect for my date tonight. The lovely Sally Furth is breathlessly awaiting my arrival at Vandy. Seems she just adores MAC astronauts," revealed the Rhinestone Flyboy with visions of sallying forth with Sally.

Meanwhile, *Columbia* began its automatic roll reversal to the left at 215,000 feet and another back to the right at an 8,000-foot-per-second descent rate and up to a 70° bank. C.R. flew the manual roll reversal at 115,000 feet and Mach 5. The *Columbia* slowed as Sam finished the last roll reversal at 85,000 feet and Mach 2.8.

"Visual, Sam, I've got California visual!" proclaimed the Addled Aviator, bringing the craft down manually.

"But Boss, we're supposed to fly a 20 degree glide slope for the landing at Vandy," called Sammy.

"No sweat, I'll fly this beauty right down the ol' slot. It's times like these where my long years of flawless flying come in handy," beamed the Space Star.

"Boss, didn't we overly Vandenmiss? We just got a call from mission control who asked for our intentions for landing. They said we were in a direct line for the alternate landing site at White Sands Missile Range. The Northrup Strip there is landing Runway 05," briefed the mission pilot.

"Nonsense, m'lad. We're on time and on target. I even programmed the destination coordinates for Vandy into the inertials myself. I have that date with Sally Furth, ya' know," explained the Repetitious Rake.

Sam, quickly checking the coordinates for Vandenmiss called out, "You put in 118° 35' W instead of 120° 35' W into the inertials."

"Merely checking your instrument cross-check procedures, Sammy m'lad. I was hoping you'd catch this planned coordinate change earlier. I'll have to document this on your Form 21, of course. In the meantime, swing around toward Vandy and let mission control know we're still golden for landing, only we'll be a couple of minutes late."

"Sure, Boss," answered the slightly scolded mission pilot with a sigh of resignation.

"*Columbia*, this is Mission Control. The Secretary of the Navy will be meeting you on landing. Something to do with satellite placement."

"Roger, Mission Control, *Columbia* copies," acknowledged the now sullen Sam.

As the *Columbia* approached the pre-flare at Vandenmiss, the Wayward Warrior philosophized, "Perhaps the Navy's so pleased with my idea for concentrating satellites for the Atlantic fleet that they will give us the exclusive contract, eh, Sam?"

"I don't think so, Boss. I don't think so."

QUICK STOPPERS

Flexible Response

The UH-1 pilot was taking off for a functional check flight after a phase inspection. After accelerating to 20 knots about 50 feet from the helipad and only about five feet above the ground, the pilot suddenly heard the rpm alarm and saw the rpm warning light come on. With engine rpm decreasing and the rotor rpm rising, he suspected a flex drive shaft problem and so reduced throttle immediately and made a quick autorotation. Although the aircraft slid about 100 feet after landing, it sustained no further damage. The pilot's swift and correct analysis and prompt action prevented a more serious mishap.

Herky-Bird Strike

The B-model Herk touched down around 1,500 feet from the threshold of a 9,000-foot runway for a no-flap touch-and-go. Power was applied and the Herk pulled abruptly to the left. The crew noted a loss of torque and rpm on number one engine, and successfully rejected and shut down the ailing Allison. Post-flight inspection revealed a blood smear along the bottom of the number one inlet duct fuel control air sensing probe. Inspection of the runway found the remains of a small hawk about 3,000 feet from the approach end. Further static tests of the engine were unsatisfactory until the fuel control was changed. Changing the fuel control corrected the "FODed" control inlet pressure sensing bellows. A bird strike can happen anytime, even during a touch-and-go. Be prepared!

Flare Up

The C-141B was descending over the threshold when suddenly the copilot, who was flying, made an abrupt pitch change, supposedly to slow the sink rate. The Starlifter bounced and the aircraft commander took control, completing a more normal touchdown and roll out—log two landings, please engineer. Since neither touchdown was judged "hard"—firm but safe, right—the crew taxied in and shut down. Imagine their surprise when the maintenance folks informed them of damage to the aircraft's aft belly under the troop doors. It's "easy does it" in the flare to prevent embarrassing tail scrapes.

The Real Thing

Just prior to descent from FL 370, the Starlifter crew noticed that number 3 engine oil pressure was fluctuating slightly (2 to 5 psi). The engine scanned clean and all other indicators were normal, so the descent, approach and landing were all uneventful. But when they blocked in and shut down number 3, the scanner suddenly reported a fire. The crew requested fire equipment posthaste, but the alert crew chief used the handy fire bottle to extinguish the blaze before the fire trucks arrived. All passengers and crew evacuated safely and the damage was restricted to the engine. Seems the fire was fed by an oil leak that completely emptied the tank before all the smoke cleared.

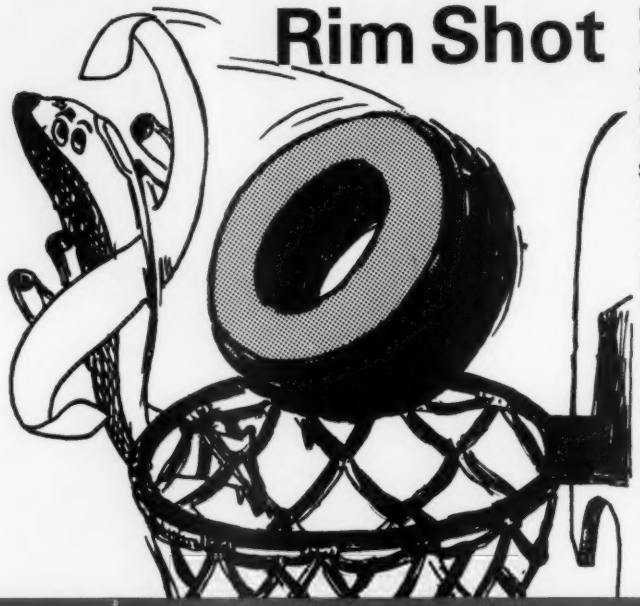
Notable Quote

A bore is a person who talks when you want him or her to listen.

Sabreliner Slip

Here's the situation: 400-foot ceiling, ¼-mile visibility in heavy snow, wet snow on runway with center portion plowed and broomed, and a CT-39 on short ILS final. The crew set up for a wet slippery landing with touchdown on centerline about 1,500 feet from the approach end. The pilot began braking, but after some deceleration the Sabreliner began drifting left with the left gear starting to roll through the uncleared snow and slush. The pilot "corrected" back to the right, but was unable to keep the aircraft from continuing to the right through the slush. The plane exited the runway still traveling between 30 and 50 knots "snow speed." Oh yes, the pilot did have a 7-knot crosswind pushing him across the slippery surface in that direction.

Rim Shot



Normal inspection of any runway can be pretty revealing. Particularly noteworthy was a 2-foot piece of wheel rim found near the edge of the runway at an overseas base. Said rim belonged to a Stretch Starlifter long since departed for Home Station AFB.

The 'lifter in question made an uneventful landing back at the homedrome, save for a deflated tire caused by failure of the number 4 rim. While the aircraft was still on the runway, the maintenance folks changed the number 3 and 4 tires, the number 4 rim, and the C-141B brake assembly. The stricken "Stretch" was then towed off the runway to parking.

ILL-FATED LIFTOFF

Shortly after the twin-engine Piper lifted off the 9,500-foot runway, the pilot reported engine failure to the tower. Clearing the crippled aircraft for an immediate return, the tower controller watched helplessly as the plane rolled to the right and dove to the ground from 150 feet and crashed just short of the end of the runway. The impact killed the pilot and all aboard. NTSB investigators could find no physical evidence of engine failure, although the prop was definitely feathered. They concluded there had been a substantial power loss at or just after liftoff, but could not determine its cause. They also calculated that there was sufficient runway remaining, even from 150 feet, for the pilot to abort the takeoff and land safely. In fact, they figured he would have been able to stop with 700 feet of runway to spare. Delving into the human factors involved, investigators surmised that the pilot probably became preoccupied with the engine malfunction. He thus didn't attempt an immediate landing on the remaining runway. Even if the pilot judged he was too high for an immediate landing, raising the landing gear and flaps would have allowed for a successful single engine climb. Thus, indecisiveness, stemming from a lack of familiarity with the aircraft and its emergency procedures and performance, put the ill-fated pilot into a situation from which he was unable to escape.

AFTER DEADLINES

••••• SYSTEMS UPDATE •••••

C-141/C-5 FUEL SAVINGS ADVISORY SYSTEM (FSAS) - On 11 June 1981 WR-ALC awarded a firm fixed price contract to Lear-Siegler, Inc., Grand Rapids, Michigan, for an on-board, computerized Fuel Savings Advisory System (FSAS) to be installed in C-141 and C-5 aircraft. A commercially available system, the FSAS computes optimum fuel efficient settings based on variable data input to the system by the aircrew. When interfaced with the aircraft's autopilot/auto-throttle systems, the FSAS will automatically set the most fuel efficient cruise/climb parameters. A seven month flight test of a Delco Electronics FSAS aboard three C-141 aircraft in 1980 resulted in approximately 2.5 percent fuel savings. The savings in fuel expected for the first year for both the C-141 and C-5 may reach 20,000,000 gallons. Trial installations begin in January 1982, with production installations scheduled to begin in July 1982. C-141 installations will be accomplished during Programmed Depot Maintenance (PDM) and supplemented by depot field teams at a rate of 20 per month. C-5 installations will be done during PDM at a rate of four per month. Information courtesy of WR-ALC/MMSH.

FUEL CELLS FILLED WITH BLUE FOAM are on tap for all MAC C-130 outfits. As a result of past mishaps, HQ USAF has approved a modification proposal to install the new MIL-B-83054B polyether (type IV blue) fire/explosion suppressant foam in all C-130 fuel cells. The task will be accomplished at depot level as a TCTO during PDM and by contract field teams at selected field team sites. MC-130E combat talon and the AC-130H gunships, already equipped with the older yellow/orange (type III) foam, will get the newer blue foam installed under a separate program. The mod program was kicked off in October 1981 when the Warner Robins Air Logistic Centers produced the first kits. The $41.9 million program is scheduled to be completed in the second quarter of 1985. Information courtesy of WR-ALC/MMSF.

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-Cartoon courtesy of 1Lt Al Tyler, HQ MAC/PA

I said camouflage the AIRCRAFT in SPACE 5; *not* the SPACECRAFT in AREA 5 !!